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Mathematical Geography

Zonia Baber

True geographic concepts are not composed entirely of plains, mountains, oceans, and other attributes of the earth's surface; the sun in its differing relations to the earth plays a most important part in the formation of such concepts. The difference in the winter and summer aspects of temperate North America, for example, would be appreciated with difficulty by an untraveled inhabitant of lowland equatorial tropics, inured to the monotony which results from a uniform twelve-hour day. Although twice in the year he would cast no shadow at noon, and during one-half of the year his shadow would fall to the north, while during the other half it would fall to the south, still the change would not be sufficiently marked to break the dull uniformity of daily and yearly existence. A cold, dark day in which the sun did not appear above the horizon, even at noon, would seem no less wonderful to him than a day in which the sun made his entire circuit throughout the twenty-four hours without dropping below the horizon even at midnight.

In our latitude the constantly changing picture stimulates interest in causation. Even the young children are curious to know where the sun goes when it drops below the horizon. The little five-year-old child who asked how the year could go on making days showed an early and intelligent interest in astronomical geography.

All primitive people, or those who try to account for natural phenomena by mythical rather than by scientific methods, have shown a deep appreciation of the phenomena of sunrise, sunset, spring and autumn equinoxes, winter and summer

solstices, as shown in their festivals and folk-lore.

It would not seem strange if a people living in a tropical climate were less rich in myths setting forth the relation of the sun and earth than a more northern folk, to whom the coming of the sun meant perhaps the relief from a long, cold famine.

It is not strange that a people geographically circumstanced as are the northern Norwegians should wait with restless eagerness and receive with great rejoicing the first appearance above the southern horizon of the ruddy face of the sun.

When a pupil can in imagination place himself in any latitude, on any day of the year, and describe the sun's apparent path in the heavens, he has a key to much geographic knowledge.

The lack of accuracy in observation of the sun's path in the heavens in his own locality is the great obstacle in the way of the pupil's imaging its apparent movements in other latitudes.

Even the primary pupils are interested in making and recording accurate observations of the sun, if there seems to be a necessity for such knowledge, as is shown in the correspondence of the grades with foreign children.

(See geography outline, December COURSE OF STUDY.)

The record of the length of the noon shadow of a certain object, made at regular intervals, will not only impress one with the fact that the shadow lengthens and shortens, but with the peculiarities of the movement.

The exact time at which the sun crosses

the observer's meridian can be obtained by recording the length of the shadow every few minutes before and after noon;



Fifth Grade finding noon shadow and obtaining declination of sun.

the shortest shadow will be the noon shadow, and will fall on a north and south line.

This record, together with that of the length of the day, position of the sun on the horizon at rising and setting, kept for one year, would afford an excellent basis for pupils mature enough to use it for imaging the implied relations of the sun and earth. If he has established the causes of the phenomena in his own locality, he has discovered the same for the entire earth.

(See January COURSE OF STUDY, page 429—Mr. Myers's Outline on Astronomy.)

Pedagogic School

Continue unfinished work outlined in January COURSE OF STUDY.

Past geographies of North America.

How are the past aspects of a continent obtained?

What are the evidences that North America has had different coast-lines?

What are the evidences that the continent has passed through many changes of climate?

What proofs are there that the topography has changed?

Visit Field Columbian Museum. Study geologic exhibits.

What distinguishes the geologic epochs?

Can you trace any evolution of life in the paleontological exhibit at the museum?

Considering the maps of the past geographies of North America as the maps of the archæan, silurian, carboniferous, cretaceous areas, etc., what inference in regard to the development of the continent seems just?

Would you predict a larger or smaller future North America?

On Thursday morning, February 28th, Prof. R. D. Salisbury, of the University of Chicago, will lecture to the pedagogic school on "The Evolution of North America."

References: Dana, *Manual of Geology*; Geikie, *Text-Book of Geology*; Scott, *Introduction to Geology*; Tarr, *Elementary Geology*; Shaler, *Story of Our Continent*.

Pedagogic questions: Is the knowledge of the geology of a region of value in the study of its present geography?

At what age are children interested in the causal aspect of things?

In teaching the continent of North America to fifth-grade pupils, for instance, what part of its geology, if any, would you present?

How would you introduce it?